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The USENIX Association Newsletter

Volume 9 Number 6

December 1984

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NOTICE

;login: is the official newsletter of the USENIX Association, and is sent free of charge to all members of the Association.

The USENIX Association is an organization of AT&T licensees, sub-licensees, and other persons formed for the purpose of exchanging information and ideas about UNIX[†] and UNIX-like operating systems and the C programming language. It is a non-profit corporation incorporated under the laws of the State of Delaware. The officers of the Association are:

| | | | |
|----------------|---------------------|-----------|-------------------|
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Member services are provided through the Association office. Membership information can be obtained from the office:

USENIX Association
P.O. Box 7
El Cerrito, CA 94530
(415) 528-8649
{ucbvax|decvax} !usenix !office

Members of the UNIX community are heartily encouraged to contribute articles and suggestions for *;login:*. Your contributions may be sent to the editors electronically at the addresses above or through the U.S. mail to the Association office at the address above. The USENIX Association reserves the right to edit submitted material.

;login: is produced on UNIX using *troff* and a variation of the `—me` macros. We appreciate receiving your contributions in *n/troff* input format, using any macro package. If you contribute hardcopy articles please leave left and right margins of 1" and a top margin of 1½" and a bottom margin of 1¼". Hardcopy output from a line printer or most dot-matrix printers is not reproducible.

Acknowledgments

The Association uses a VAX[‡] 11/730 donated by the Digital Equipment Corporation for support of office and membership functions, preparation of *;login:*, and other Association activities. It runs 4.2BSD, which was contributed and installed and is maintained by Mt Xinu. The VAX uses a sixteen line VMZ-32 terminal multiplexor donated by Able Computer of Irvine, California.

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Winter 1985 USENIX Conference

The Winter 1985 USENIX Conference will be held January 23–25, 1985, at the Fairmont Hotel in Dallas, Texas. The conference will feature eight tutorials, two days of technical presentations, Birds of a Feather sessions, films, and a meeting of the USENIX Board of Directors with the members; the agenda for these events is given below. The conference is being held concurrently with /usr/group's UniForum Tradeshow, which will be held at the Infomart in Dallas on January 21–25.

USENIX Conference Proceedings, containing all papers submitted prior to the conference, will be distributed at the conference. Additional copies of the Proceedings may be purchased at the registration desk or may be ordered after the conference from the USENIX Office.

A registration packet was mailed to a large mailing list in late November. It contained details on the tutorials and fees, a registration form, a hotel reservation form, information on special air fares, etc. If you did not receive a registration packet, please contact

USENIX Conference Office (213) 592-1381 or (213) 592-3243
P.O. Box 385
Sunset Beach, CA 90742

Tutorials and Technical Program

A set of eight tutorials will be held concurrently on Wednesday, January 23, from 9am until 5pm. They have been organized by Michael Tilson of Human Computing Resources Corporation. The tutorials will be intense, in-depth sessions, with attendance limited to approximately 150 persons each. Pre-registration is strongly advised; on-site registration will be allowed, if space permits. Attendees at the 4.2BSD Internals tutorial must be covered under a 4.2BSD source license; information on license verification is contained in the registration packet.

Charisse Castagnoli of Teknekron Infoswitch Corp. and Rob Kolstad of Convex Computer Corp. are the Conference Program Co-Chairs. They received dozens of abstracts of papers for the technical program. Abstracts were refereed by the conference chairs and session chairs; accepted papers will be published in the proceedings. The papers to be presented are listed in the conference agenda below.

Birds of a Feather sessions (BOFs) may be scheduled in advance by contacting the USENIX Conference Office (see above). BOFs may, of course, also be scheduled on-site.

A live demonstration of the satellite netnews experiment is planned.

Conference Agenda

WEDNESDAY, JANUARY 23

9:00– 5:00 Tutorials

4.2BSD Internals (4.2BSD source license required)

Kirk McKusick & Mike Karels, University of California, Berkeley

The ANSI C Standard

Larry Rosler, AT&T Bell Laboratories

UNIX Networking

Bruce Borden, Silicon Graphics, Inc.

Advanced C Programming, Illustrated by Classical Algorithms

Walter Brown, Moravian College

Writing UNIX Device Drivers

Ken Greer, Elan Computer Group

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UNIX Language Tools

William Appelbe, University of California, San Diego

UNIX Interprocess Communication

Robert Hutchison, Auxco

uucp, Mail, and News

Mark Stein, Fortune Systems

UNIX System Administration

Ed Gould, mt Xinu

Evening Birds of a Feather Sessions

THURSDAY, JANUARY 24

8:30— 8:45 Opening Remarks

8:45— 9:30 Keynote Speaker

Whither the Gurus

Rob Kolstad, Convex Computer Corp.

9:30—10:30 Satellite News

Chair: *Lou Katz, University of California, Berkeley*

Netnews via Satellite: A Progress Report

Lauren Weinstein, Vortex Technology

Research into Liability Issues in Netnews Transmission

Susan Nycum, Gaston Snow & Ely Bartlett

10:30—10:50 Coffee

10:50—12:20 Kernel Implementation

Chair: *John Quarterman, University of Texas, Austin*

Implementation of UNIX on the Convex C-1 Processor

Jim Mankovich & Rob Kolstad, Convex Computer Corp.

Device Drivers in a Multi-Processor Environment

Ed Gould, mt Xinu

A Multiple CPU Version of the UNIX kernel

Al Nugent, Masscomp

About Tape Drivers

Dean Thomas & Dwight H. Leu, The Santa Cruz Operation

12:20— 1:40 Lunch

1:40— 3:40 Languages

Chair: *Steve Johnson, AT&T Bell Laboratories*

Generic Software in Modula-2

Gene Rollins & Ed Satterthwaite, Tartan Labs

An Implementation of DIBOL under UNIX

Gary Aitken, Kenneth & Christine Scott, Finished Software & SHA Computers Inc.

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Modula-2: An Alternative to C for System Programming
Morris Djavaheri & Stan Osborne, San Francisco State University
Panel Discussion of C versus Other Languages on UNIX
Steve Johnson & Michael Powell, AT&T Bell Laboratories & DEC

3:40— 4:00 Coffee

4:00— 5:30 User Interfaces
Chair: *Alfred Correria, Computer Thought Corp.*
Development of a Compiler for the Bourne Shell
Vincent Kasten & Paul Ruel, Concentric Associates, Inc.
Access: A Program to Interpret Pathname Access Permissions for UNIX
Steve Mahler & David Curry, Purdue University
A High-Performance Model for 2-D Alphanumeric Display Generation
Paul Bame, Hewlett-Packard

6:00— 7:30 Meeting of the Board of Directors with the Members

Evening Birds of a Feather Sessions
Films: *A Guided Tour of Program Design Methodologies and Software Quality*

FRIDAY, JANUARY 25

8:30—10:30 Networking
Chair: *Joe Kalash, University of California, Berkeley*
Implementing XNS Protocols for 4.2BSD
James O'Tool, Chris Torek, Mark Weiser, University of Maryland
Kernel Networking Support
Joseph E. Requa
Transparent Integration of UNIX and MS-DOS
C. Kline, G. Popek, J. Rothschild, R. Schulz, J. Uttal, Locus Computing Corp.
Design Proposal for a Completely Resilient Distributed File System
Richard Fox, University of California, San Diego
Overview of the Sun Network File System
Bob Lyon & Gary Sager, Sun Microsystems

10:30—10:50 Coffee

10:50—12:20 Standards and Directions
Chair: *John Chambers, Microelectronics Center*
Latent Source Bugs and UNIX System Portability
Alan Filipski, Motorola Microsystems
The Clipboard Data Interchange Facility
Robert T. Nicholson, Sydis Inc.
It Can't Happen or /* NOTREACHED */
Geoff Collyer & Ian Darwin, University of Toronto
Inexpensive UNIX Systems
John Bass, DMS Design

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An Enhanced *getopt* (1)
T. C. Jones & L. A. Kennedy, AT&T Bell Laboratories

12:20— 1:40 Lunch

1:40— 3:10 Software Tools and Applications

Chair: *John Trudeau*, Teknekron Infoswitch

SETOPT-Command Line Option Parser Generator
Gary Pearlman, Wang Institute of Graduate Studies

troff's Got a Lot of Life in It Yet
Rober Lawson, Avi Naiman, David Slocombe, SoftQuad Inc.

Cscope: A Tool to Interactively Examine a C Program
Joseph L. Steffen, AT&T Bell Laboratories

A Basic Direct Access Method for UNIX
Robert R. Richards, Chemical Abstracts Service

Distributed System Maintenance
Daniel Nachbar, Bell Communications Research

3:10— 3:30 Coffee

3:30— 4:30 Performance

Chair: *Tom Ferrin*, University of California, San Francisco

Monitoring System and Process Performance
William J. Meyers, SCI Systems

Up the Down Elevator
John Bass, DMS Design

Interpreting UNIX Benchmarks
John Saxer, CIE Systems

4:30— 5:30 uucp and Usenet

Chair: *Tom Watson*, Scientific Machines Corp.

USENIX *uucp* Project Progress
Karen Summers-Horton & Mark Horton, AT&T Bell Laboratories

A Parser for Electronic Mail Addresses
Peter Honeyman, Stephen North, Pat Parseghian, Princeton University

Automatic Forwarding of Mail in CSNET
Michael T. O'Brien, Bolt Beranek and Newman

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Future Meetings of the USENIX Association

The Summer 85 Conference of the USENIX Association will be held June 11-14 at the Marriott Hotel in Portland, Oregon. There will be both technical presentations and exhibits.

The local arrangements host is:

Steve Glaser
Tektronix, Inc.
502-685-2562
tektronix!steveg

The program chair is:

Steve Bourne
Digital Equipment Corp.
130 Lytton Ave.
Palo Alto, CA 94301

Please mail him your abstracts and suggestions.

If you require further information before the meeting pre-registration packet is mailed, or if you wish to exhibit at the conference, please call the USENIX Conference Office at 213-592-1381.

USENIX Searching For An Executive Director

As the USENIX Association continues to grow, it is becoming apparent that relying upon volunteer labor to manage the Association is no longer feasible. The Board of Directors has decided to hire an Executive Director to oversee the functioning of the Association.

The Executive Director will report directly to the Board and will be responsible for the smooth operation of the USENIX Association; major duties will include:

1. Supervision of member and office services and management of office staff
2. Responsibility for operation of the Association's computer
3. Supervision of conference planning
4. Supervision of newsletter and distribution tape production
5. Fiscal control, monitoring, and control of expenditures
6. Handling of minor policy issues
7. Handling public relations.

This role is expected to develop into a strong leadership position. Candidates for this position should have previous management and supervisory experience and should be familiar with the basic usage of computer systems, preferably UNIX. The candidate must have sufficient maturity to handle minor policy matters and work without supervision or direct guidance, and must be self-motivated, well organized, and thorough with attention to detail. The ability to interact and deal politely, tactfully, and effectively with a broad assortment of people is also required.

The position will be based at the USENIX office in El Cerrito, California. Anyone interested should send a resume to the USENIX office:

{ucbvax, decvax}!usenix!execdir

USENIX Association
P.O. Box 7
El Cerrito, CA 94530
Attn: Office Committee

Or, for more complete information, contact:

| | |
|------------------|----------------------------------|
| Deborah Scherrer | {ucbvax, decvax}!usenix!scherrer |
| Tom Ferrin | {ucbvax, decvax}!usenix!tef |
| Lou Katz | {ucbvax, decvax}!usenix!lou |

USENET in the Sky

Satellite Distribution of Netnews: The Stargate Experiment

Lou Katz

Introduction

Several thousand computer sites in the United States, Canada, Europe and Australia are linked together into a logical "network" which permits the transfer of messages directly from one individual to another (mail) and the posting of messages to be read by anyone who is interested (news). The many sites on this network which are involved with news transfers collectively are called USENET. More specifically, USENET is defined as all sites receiving the newsgroup net.announce. A USENET link between two sites is one that net.announce is sent over. Note that this is different from a *uucp* link, over which mail and file transfers may occur but not necessarily news.

As more computer sites have gained access to this network a number of problems have arisen, in particular with respect to the communications costs incurred in the operation of this net and to difficulty of new sites obtaining access. As usage increases, USENET is faced with the spectre of increased costs possibly forcing curtailment of network activity, an eventuality which is causing great concern in the network community. Furthermore, the magnitude of the load which news places on a site is so large that new sites have great difficulty finding a site willing to feed news to them. Many new sites wishing to get such information are without connections.

At the present time it is estimated that there are about a thousand sites in the network, with that number growing daily! Total network traffic is basically proportional to the number of sites, so that traffic is growing too.

It is vital to realize that network services, to be useful, must connect to the machines a particular individual uses regularly and as a matter of course. For news and especially for mail, it doesn't work for the person to have to make an individual special call to a different machine just to see if there is mail or news for him/her, any more than it makes sense to walk two miles to the post office each day just to see if there is mail, when there often will be none.

Note however, that USENET IS NOT A NETWORK in the formal sense! That is, unlike all other nets (ARPANET, CSNET, BITNET, etc), there is NO administration, no central structure, no joining, and no membership to USENET. The net actually represents the human and professional network of personal, technical and business contacts, and PAIRWISE desires for groups or individuals to communicate and share information easily.

It is just this pairwise organization which gives the network its vitality. Without the burden of administration, all that is required is the telephone switched network, which permits any machine, anywhere to contact any other machine DIRECTLY, subject only to administrative and software agreement between its managers. Some pairs of sites are linked via dedicated high speed circuits, because of the volume of traffic between them. This linkage is not, however, crucial to the operation of USENET.

News forwarding often represents a massive percentage of the overall data traffic flowing through a given USENET site. Some sites have taken this responsibility upon themselves for a variety of reasons, but most sites will only receive news or forward it to very specific recipients. Mail is treated somewhat differently, and many sites will forward mail as a professional courtesy to others, which improves overall mail performance, and helps ensure that others will forward mail to them.

Estimates indicate that MAIL accounts for about 15% of the network "load" and NEWS for about 85%, although at high volume nodes or central sites which forward both news and mail, mail may reach 50%.

For two machines to be networked, they have to be connected in some manner. This connection can be a dedicated link (leased phone line, internal wires within a site, infrared relay, fiber optics) or a shared link such as a dialup line. Dedicated links, except for the trivial case of running a wire between

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two machines in the same room, almost always involve dealing with large external entities such as local phone company and common carriers to get special dedicated wire services. These links are expensive, are rapidly growing more expensive, and can involve very long (months or longer!) waiting periods for installation in many areas.

The cost of network phone calls is hard to see directly. However, if one conservatively estimates that there is about 1 Mb of news every DAY, and if this is transmitted at 1200 bits per second with an error-correcting transmission protocol, there are roughly 3 hours of transmission per day. Current phone rates run about \$.15-\$.30/minute in the dead of the night (the times usually selected for transmission, just to keep the costs down) either interstate or intrastate. If a site getting news initiated the call itself, it would spend about \$36/day or a little over \$1000/month on such phone calls. Unfortunately, many phone calls wind up with bad circuits, giving numerous retries and aborted messages. This can add up to a factor of two on call costs. If two sites attempt to utilize a single phone line for both a feed in and a feed out they are likely to utilize the entire 11pm-8am nighttime rate slot on one line. Since there is a pyramiding effect with each site servicing several below it, a single site could easily dedicate two or three lines just to network service, and often wind up using more expensive evening and daytime connections.

If only one hundred sites have to make non-local calls for this purpose, the national phone bill attributed to network activity would be over \$100,000/month! This amount may very well be much too conservative, as reliable rumors suggest that the phone bill for one particular site is significantly in excess of \$20,000/month!

New technology is beginning to provide us with modems capable of working on the nationwide switched network at speeds of 2400 bps, or double the present common speed. The costs of these modems are much higher than the common 1200 bps hardware. Installation of such devices could cut some phone bills considerably (though by less than half, due to various technical factors), but only if both sides of a connection have them. It is unfortunately easier for many system administrators to justify rising phone bills than to receive approval for such a specific purchase, often from a different budget category, so that faster modems may not provide any relief. In fact, even if phone bills COULD be cut in half in this manner, the costs would still remain very high, and would still grow constantly worse as the network grows and news traffic continues to increase.

A Possible Solution

Lauren Weinstein has presented at the Summer 1984 USENIX Conference in Salt Lake City (Cf. Conference Proceedings, p. 18) a promising technological solution to the most pressing part of the problem, the cost of news transmission. The idea is as follows: portions of the video signal on TV transmission are not used for picture information, and can carry other information, in particular, suitably encoded ASCII. The effective bandwidth of this type of transmission could easily exceed 65 Kbps. It should be possible to establish a computer system at the "headend" of a cable or satellite transmission system, and upload such information piggyback on the TV signal. Any site which wished to receive the data would get a decoder and either a cable link or a satellite receiver dish.

The decoder would have sufficient internal memory to store a significant fraction of a day's news transmission (e.g. 500 Kbytes), so that the local computer could buffer and flow control the input and select and extract the information it wanted from the decoder at its own pace. Estimated costs for the decoder are about \$1000 each (retail) and about \$1300-\$1500 for a satellite dish for most locations in the continental U.S. and parts of Canada, if the channel with the information were not also carried by a local cable TV company.

The economics of netnews would then change radically. No longer would a fanout of news have to occur over the dialup network. Rather, each item could be transmitted ONCE to the head end distribution computer, then "broadcast" for all to receive over the satellite system. The TOTAL "national" phone bill for news then decreases to about \$1000/month, instead of several hundred thousand dollars.

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The cost of the original transmission which occurs when an item is submitted (the phone call from the submitter's computer to the satellite link) is obviously borne by the submitter. The costs of the reception equipment and decoders are either one-time costs to the installation, easily amortized over a few months of phone bills, or else handled as monthly rental fees. This scheme does not, in any way, cut off the current mode of transmission of netnews. However, as more and more sites have to examine their phone budgets, they will generate both dollars and justification for inclusion of more and more newsgroups via satellite transmission.

The Experiment

Lauren Weinstein has secured the cooperation of several corporations and institutions in conducting an experiment into the technical feasibility of this mode of transmission.

The purpose of the experiment is to test the reception quality, error rates, flow control and system reliability and functionality. Reception will be tested both directly from a small reasonably priced microwave dish, and from ordinary cable-TV service in a number of locations.

The USENIX Association is providing support for incoming phone lines at the transmitter site, a small microwave receiver dish to test that mode of reception and travel to the transmission site to set up the system. The Association is also providing coordination of the efforts of Lauren Weinstein and the other participants, as well as dissemination of the results through written articles in *;login:* and, of course, over USENET, and a presentation at the January technical meeting in Dallas. If technical conditions permit, there will also be a live demonstration of the system at that meeting.

SSS (Southern Satellite Systems, Atlanta, Georgia) is supplying the experiment with continuous use of one scan line in their broadcast signal, with an effective baud rate of 1200 baud for a few months. They are also providing access to the uplink encoder which will properly format the input ASCII information and insert it into the TV signal. These transmissions are going out under the TV signal of WTBS, the Atlanta-based "Superstation", which is widely available throughout the United States. They are also providing two sets of tuners and decoders for receiving the signal directly and extracting the ASCII stream from the video.

Bell Communications Research (BCR) is providing modems for the uplink facility and other support.

Fortune Systems Corporation (Redwood City, California) has provided the uplink computer, a Fortune Systems XT30 UNIX system, which will receive netnews articles from dial-in phone lines and format them for insertion into the video signal.

If the experiment shows that we will achieve satisfactory performance from a technical point of view, the UNIX community at large will then be faced with the far more difficult problem: how to make this technology available so that USENET will flourish. The future organization of USENET is a more complex issue. For a stable network capable of functioning over the next few years, a host of legal, financial and organizational issues must be faced. How can even a modest effort be financed? What information or news groups could such a network distribute? Who would be responsible for content? These and other considerations must be worked through if satellite transmission is to become a viable facility.

Legal Research on USENET Liability Issues

The USENIX Board of Directors decided that more solid information on the legal issues relating to USENET activities was needed by the UNIX community. We arranged with our lawyers for them to supervise legal research into the issues, with the results of this research to be disseminated to our membership via publication in *;login:* and a presentation at the Dallas USENIX conference. The memorandum which Ms. Shulman prepared is printed below.

Lou Katz

To: Lou Katz
From: Gail H. Shulman
Date: November 9, 1984
Re: Scope of liabilities arising from the USENIX satellite-transmitted news service.

Introduction

Computers frequently communicate with other computers through the telephone system. USENIX might like to set up a computer facility to which individual computer users could transmit messages, and from which these messages would be transmitted through a satellite, thereby obviating most of the need for the telephone system. In the proposed USENIX service, these communications could be directed and available only to authorized users of the service indiscriminately (the service hereinafter referred to as "USENET" and its contents as "NEWS"). It would be, in essence, an electronic bulletin board.

USENIX has not yet defined its role in this service. It would like to assist in the maintenance, growth and development of USENET by providing lower cost alternatives to the current system as the means for the transmission of messages in interest to UNIX users. For obvious reasons, however, USENIX would like to minimize its potential liabilities. Consequently, this memorandum will address the following issues:

1. What are the potential liabilities of USENIX as the provider of the USENET service?
2. What are the potential liabilities of the individual NEWS senders in the proposed system?
3. How may USENIX effectively minimize its liabilities in the new communication system?

Discussion

I. What are the Potential Liabilities of USENIX as the Provider of the USENET Service?

The issue of USENIX's liability with regard to the proposed communication system cannot be answered definitively. There is no clear precedent which indicated the legal standards to which USENIX will be subject. However, through analogy to other communication systems, we can speculate about the scope and extent of USENIX's liability and can propose possible methods of protection.

Communications entities are held to different standards of responsibility depending upon their activities and the extent to which they control the content of the messages they distribute. Newspapers, broadcasters, common carriers, computers and various combinations thereof (i.e., electronics mail,

cable television, videotex and telex) each owe different legal duties to the public. In order to determine the standards to which USENIX will be subject, one must first analyze USENIX's purpose and function in providing the service. Since USENIX's proposed system would make use of the radio frequency spectrum, over which the Federal Communications Commission ("FCC") has exclusive jurisdiction, this analysis must also assess how that federal agency would regulate the service.

Under the Communications Act of 1934 as amended (the "Communications Act"), USENIX might be classified either as a broadcaster, as a common carrier, or as a special entity treated on an *ad hoc* basis. The Communications Act defines broadcasting as the "dissemination" of radio communications intended to be received by the public, directly or by intermediary of relay stations.¹ Radio and television are the most obvious examples of broadcasting. Broadcasters' signals are transmitted into space for anyone to receive, and broadcasters have control over the content of their own programming. In contrast to broadcasters, common carriers provide communications services to the public at large, and their customers control the content of their messages.²

Broadcasting and common carriage are the two traditional means of communicating by means of the radio frequency spectrum. Changes in technology, however, have begun to blur distinctions within the field of telecommunications. As is true in most other areas, the law is slow to adapt to and change with these new developments. As just one example, Congress passed the Communications Act in 1934, and it therefore contains no mention of cable television systems. Consequently, there has been a heated debate over the classification and regulation of cable television. The result of that debate is that it is regulated neither as broadcasting or as a common carrier service, but as an adjunct to the nation's broadcasting system with its own special rules and regulations.³

One task in the analysis of ultimate liability for USENET is to identify the like classification of the service for purposes of FCC regulation. The difficulty is that USENET, being part telecommunications and part computer service is neither fish nor fowl, neither broadcaster nor common carrier. The classification of USENET is therefore not self-evident. The Court of Appeals for the D.C. Circuit recently addressed the regulatory problems posed by the growing interdependence of telecommunications services and computer technologies.⁴ The Court determined that the provision of transmission capability over a communications medium with little or no interaction by the provider with customer-supplied information, constitutes common carriage.⁵ However, the Court held that services such as USENET which combine basic transmission capacity with computer processing applications which act upon the format or the content of a subscriber's transmitted information, are non-common carrier activities and are as yet not classified.⁶

The classification of USENIX's USENET service in the proposed communication system, although uncertain, is nonetheless critical to the determination of USENIX's potential liabilities. The key issues involved in categorizing USENIX as a broadcaster, common carrier or special entity are (i) to what extent will USENIX control the content of the information it transmits?; (ii) are the transmissions intended to be received by the public, or does the additional equipment necessary to receive the signals prevent a significant portion of the populace from receiving them?; and (iii) is USENIX acting purely as a disseminator of NEWS?

Although there is no legal precedent clearly establishing USENIX's position in the proposed communication chain, the current state of the law suggests that USENIX is likely to be treated as a broadcaster if it controls or is responsible for the content or timing of what is transmitted information; or as a common carrier if it indiscriminately transmits information provided by the public without exerting control over content or timing. It is also possible that the law will treat this as a new and special entity without a clear indication of its regulatory status. Given this uncertainty, USENIX's potential liabilities are therefore difficult to predict.

II. Areas of Potential Liability

This segment of the discussion focuses on several areas of the law where USENIX liabilities may arise. The classification of USENIX's function in the proposed systems will, as noted above, determine the extent of such liability.

A. Defamatory Matter

Defamation is an invasion of an interest in reputation. The tort involves a publication which is false, defamatory and unprivileged, and which has a natural tendency to injure or which causes special damages. It consists both of libel, which is a fixed representation, and slander, which is a publication by more transitory means. Broadcasters are held liable for defamatory statements of third parties using their facilities even though they have no knowledge of the defamation itself.⁷ The rationale for holding broadcasting to such a high standard of care is that:

"... They are publishers more nearly analogous to a newspaper . . . than to a telegraph company. They are not engaged solely in rendering the service of transmission to those who seek it. For their own business purposes they initiate, select and put upon the air their own programs . . . and they cooperate actively in the publication."⁸

In contrast to broadcasters, common carriers are purely transmitters. Carriers are not involved in the content of publications. Common carriers are therefore not held liable for defamatory transmissions published or expressed by third persons unless they know of the transmission's defamatory character.⁹

As mentioned above, USENIX's liability for the defamatory content of its transmissions will hinge upon whether the law will treat USENIX as a broadcaster, a common carrier or a special entity. If USENIX is deemed to be a broadcaster, then it may be held liable for *all* defamatory transmissions, even though it had no knowledge of their publication. However, if USENIX is classified as a common carrier, then USENIX will not be liable for defamatory publications by a third person unless it has actual knowledge of the defamatory nature of those publications. Of course, if USENIX is deemed a special entity, no good estimate can be formulated as to its potential liability for defamatory statements.

B. Obscenity

Obscenity is defined by state laws, which usually employ the terms "lewd", "lascivious" and "indecent". The First Amendment of the U.S. Constitution limits the scope of obscenity prosecutions to cases which, when taken as whole, (i) appeal to the prurient interest in sex; (ii) portray sexual conduct in a patently offensive way; and (iii) do not have serious literary, artistic, political, or scientific value.

Obscenity has been denied First Amendment protection because its content is so offensive.¹⁰ Broadcasting obscene language has been made a federal crime.¹¹ Broadcasters are held to a high standard so as to deter the transmission of material which society deems to be unworthy of Constitutional protection.¹²

Common carriers are not held to as high a standard as broadcasters as regards the transmissions of obscene material. The rationale for this distinction is that common carriers are not involved in the content of the communications, and therefore cannot be responsible for that content. Common carriers are only held liable for obscene transmissions if they know of the obscenity. USENIX will be held to a higher standard if it is deemed to be a broadcaster and a much lower standard if it is deemed to be a common carrier.

C. Other Potential Liabilities Arising From Content of the Transmission.

The analyses applied in the above sections on defamation and the law of obscenity will also apply to other potential liabilities arising from the nature of the content of the communications, such as a transmission constituting copyright infringement or a transmission violating an individual's right of privacy. In these situations, the courts will generally hold the broadcaster to a higher standard of care due to its extensive control of the content of the transmission.

D. Additional Content Regulations Applicable to Broadcasters.

The FCC has promulgated several regulations concerning responsibility for the content of transmissions which apply to broadcasters alone. These include prohibiting the broadcasting of information on lotteries, prohibiting the broadcasting of obscenities, and prohibiting broadcasts which serve the purpose of aiding fraudulent schemes.¹³ Additionally, broadcasters are subject to the "fairness doctrine", which requires that they present to their viewers or listeners contrasting views on controversial issues of public importance.¹⁴ And, Section 315 of the Communications Act specifies that the broadcaster permitting one candidate for public office to use his or her facilities must also afford equal opportunity to all other candidates for the same office.¹⁵

E. Potential Liability for Faulty Transmissions.

If one contracts with a common carrier to transmit a message, the carrier is required to use diligence in transmitting and delivering that message.¹⁶ This duty is based solely on contract law. The rationale is that the customer pays for services and expects to receive an acceptable level of performance by the carrier. If the carrier does not transmit the message diligently, it has breached its obligations to the customer.

USENIX will not be concerned with this area of liability unless the third party sender is providing consideration for the communication service and a valid contract has been formed. We assume this not to be the case, since the proposed transmission service may be offered free of charge, although there may be fees for receivers.

F. Summary of USENIX's Potential Liabilities.

The extent and nature of USENIX's potential liabilities in connection with the operation of USENET will hinge upon the classification of that service as a communications medium. As common carrier, USENIX will have fewer and less extensive liabilities than will USENIX as a broadcaster. However, USENIX may be treated as a special entity, and as such it would be difficult to predict its potential liabilities. USENIX appears to be more like a common carrier than anything else, due to its minimal control over the content of the information transmitted and its goal to act purely as a disseminator of NEWS.

III. Potential Liabilities of the Individual NEWS Senders

A. Defamatory Matter.

Under California law, libel is "... a false and unprivileged publication by writing, printing, picture, effigy or other fixed representation to the eye, which exposes any person to hatred, contempt, ridicule or obloquy, or which causes him to be shunned or avoided, or which has a tendency to injure him in his occupation."¹⁷ Libel includes almost any language which, on its face, has the natural tendency to injure a person's reputation.¹⁸

For purposes of this discussion, we will assume that an individual computer user has sent NEWS which is false and unprivileged concerning another person, and that that information injures the

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person's reputation. The user has committed the tort of libel if by sending this information as NEWS, it has been "published".

Defamatory matter is "published" if it is intentionally or negligently communicated to one other than the person defamed and other than the defendant's spouse.¹⁹ The form of publication may be a writing, printing, picture, effigy, or other fixed representation to the eye.²⁰ Since the communication network will transmit information to a third person for representation to the eye by a screen or printer, it will likely constitute a publication, and the user may therefore be deemed to have defamed the third party.

B. Statement Infringing Upon An Individual's Right of Privacy.

California law has established the right of privacy as the right to be free from the wrongful publicizing of one's private affairs and actions which are outside the realm of public concern.²¹ The right of privacy is the right to be let alone.²²

There are several possible ways in which an individual's privacy may be violated by means of the proposed NEWS service. These include (i) publicity about private facts; (ii) fictionalization of an otherwise true story concerning another; and (iii) publicity placing another in a false light.

We will assume that the information sent fits one of the above three categories. The sender's liability hinges upon whether the transmission constitutes a "publication". In defamation cases, "publication" means to communicate to a single third party. However, in torts involving the violation of the right of privacy, the element of "publication" is only satisfied where the material is communicated to many people or the public at large.²³

The element of "publication" would be satisfied in a right of privacy action in the current or proposed USENET network system. Under this system, written or printed information is communicated to many people. Any individual who sends NEWS which infringes upon another's right of privacy may be liable under tort law.

C. Copyright Infringement.

An individual NEWS sender may be liable for transmitting copyrighted information via USENET. A copyright owner maintains several exclusive rights in copyrighted work. Included in these rights is the exclusive right to reproduce the copyrighted work.²⁴ Copyright infringement is established by documenting that the copying was unauthorized.²⁵ An individual sender of NEWS may be liable for copyright infringement if he or she transmitted copyrighted information without authorization.

D. Obscenity.

As noted above, the First Amendment does not protect material which is obscene.²⁶ The federal and state governments have recognized a legitimate interest in protecting the public by preventing obscene materials from entering the stream of commerce.²⁷ Similarly, states have a legitimate interest in regulating the use of obscene material in local commerce and in public places.²⁸

California law regulates various forms of obscenity. Its Penal Code Section 311.2 provides, in part, that:

"Every person who knowingly sends or causes to be sent, or brings or causes to be brought, into this state for sale or distribution, or in this state possesses, prepares, publishes, or prints, with the intent to distribute, distributes, or exhibits to others, any obscene matter is guilty of a misdemeanor."

This statute applies to any obscene book, magazine, newspaper, or other printed or written material or any picture, drawing, photograph, motion picture or other pictorial representation or any statue or other figure, or any recording, transcription, or mechanical, chemical or electrical reproduction of any other articles, equipment, machines, or materials.²⁹

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Individual computer users who send obscene material over the proposed communications system may be subject to the penalties of this statute or others similar to it in other states. Other California Penal Code sections which may give rise to liabilities on behalf of the individual computer users are Penal Code §311.5 and §313.1 subdivision (a). These statutes prohibit the advertisement and promotion or sale of materials represented to be obscene, and the distribution or exhibition of harmful matter to a minor. Persons committing any of these offenses are guilty of a misdemeanor.

IV. Liability Of The Satellite Transmission Company For any Tortious Transmissions Made By An Individual Sender From That Site

Those in control of the satellite transmission facilities by which an individual may send or receive NEWS may be vicariously liable for any tortious transmissions. Generally, tort liabilities for the acts of others does not arise unless there is some relationship or other circumstance justifying the imposition of such liability³⁰. Some examples of these types of relationships include (i) agency, employment or joint enterprise relationships between the prospective defendant and the wrongdoer; (ii) statutory-imposed liability on the prospective defendant (i.e. parental liability for a child's torts); and (iii) the entrusting of a dangerous instrumentality to an improper person.³¹ In order for one to be held liable for the acts of another, one of the above circumstances must be present. Similarly, the transmitter's vicarious liability for any communications sent to a user by an individual wrongdoer will depend upon whether one of the above-delineated relationships exists.

Three hypothetical situations follow concerning this general issue:

A. An Authorized, Controlled Sender.

An information sender who is authorized and controlled by the transmitter would probably be its agent or employee. The law would hold the transmitter liable for wrongful transmissions by an individual authorized and controlled by it operating under the scope of employment.

B. An Authorized Uncontrolled Sender.

Generally, when one has no control over the acts of another, no vicarious liability will arise. None of the special relationships exist from which the vicarious liability could originate. However, it is possible that the employer may be liable for the employee's wrongful acts if the employer entrusts the instrumentality to the employee who is otherwise unauthorized.

C. An Unauthorized Sender.

The transmitter would not be held liable for actions arising from the transmissions by any unauthorized sender, since, there would be no privity of relationship from which liability would arise. In conclusion, the liability of the transmitter for any transmission made by an individual using the transmitter's facility will only arise if a special relationship exists. Liability may occur to the transmitter if the individual sender is acting as an agent or employee or if the site controller should have known it was entrusting its facilities to an unauthorized person.

V. Summary

The proposed USENIX USENET service could subject USENIX to a variety of legal obligations and liabilities under state and federal laws. In most instances, the severity of these obligations and liabilities will depend upon how the service is classified for purposes of FCC regulations. To the extent that USENIX lacks control over the content of the messages it helps to transmit, USENIX should be subject to fewer and less onerous legal burdens than if it took an active role in reviewing and modifying those messages. Nevertheless, USENIX cannot realistically hope to escape such responsibilities entirely.

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Footnotes

1. 47 U.S.C. 153(o).
2. *National Assn. of Regulatory Utility Commissioners v. F.C.C.*, 525 F.2d 630, 631-42 (D.C. Cir. 1976).
3. *United States v. Southwestern Cable Co.*, 392 U.S. 157 (1968).
4. *Computer and Communications, Etc. v. F.C.C.* (D.C. Cir. 1982) 693 F.2d 198.
5. *Id.*
6. *Id.*
7. 87 Cal.L.R. 359; Restatement of Torts (Second) Chap. 24, §581(2).
8. *Id.* Comment on Subsection (2).
9. *Lewis v. Time, Inc.* (1979) 883 F.R.D. 455, 463; Restatement (Second) of Torts, §581(1).
10. *Roth v. United States* (1957) 354 U.S. 476.
11. 18 U.S.C. §1464.
12. *F.C.C. v. Pacifica Foundation* (1978) 438 U.S. 726.
13. 18 U.S.C. §§1304, 1464 and 1343.
14. *Columbia Broadcasting v. Democratic National Committee* (1973) 412 U.S. 94.
15. 47 U.S.C. 315.
16. 59 Cal. Jur.3d §22.
17. California Civil Code §45.
18. *Moore v. Green* (9th Cir. 1970) 431 F.2d §584.
19. *Farr V. Bramblett* (1955) 132 Cal.App.2d 36.
20. California Civil Code §45.
21. *Smith v. National Broadcasting Co.* (1956) 138 Cal.App.2d 807, 811.
22. *Gill v. Curtis Publishing Co.* (1952) 38 Cal,2d 273, 276.
23. *Timperley v. Chase Collection Service* (1969) 272 Cal.App.2d 697, 699.
24. 17 U.S.C. §106.
25. *Sid and Marty Krofft Television v. McDonald's Corp.* (9th Cir. 1977) 562 F.2d 1157, 1162.
26. *Miller v. California* (1973) 413 U.S. 15.
27. *United States v. Orito* (1973) 413 U.S. 139.
28. Penal Code §311 Subd. (b), §313 Subd. (b).
29. Restatement (Second) of Torts §315; Witkin, Summary of California Law, Torts, 8th ed. 2928 §649.
30. Witkin, *supra.*, at p. 2928 §649.
31. *Id.*

Local User Groups

The USENIX Association will support local user groups in the United States and Canada in the following ways:

- Assisting the formation of a local user group by doing an initial mailing for the group. This mailing may consist of a list supplied by the group, or may be derived from the USENIX membership list for the geographical area involved. At least one member of the organizing group must be a current member of the USENIX Association. Membership in the group must be open to the public.
- ;login: will publish information on local user groups. Information on local groups giving the name, address (phone number and/or net address), time and location of meetings, special events, etc. is welcome.

Please contact the USENIX office if you need assistance in either of the above matters. Our current list of local groups follows.

The Front Range group meets about every two months at different UNIX sites for informal discussions.

Front Range Users Group
N.B.I., Inc.
P.O. Box 9001
Boulder, CO 80301

Steve Gaede
(303) 444-5710
hao!nbires!gaede

Dallas / Fort Worth UNIX User's Group
Advanced Computer Seminars
2915 L.B.J. Freeway, Suite 161
Dallas, TX 75234

Irv Wardlow (214) 484-UNIX

There is an informal group that meets in the Washington, D.C., area every two months or so. The current contact for that group is:

Neil Groundwater
Analytic Disciplines, Inc.
Suite 300
8320 Old Courthouse Road
Vienna, VA 22180
(703) 893-6140
npg@lbl-csam

Unigroup is a non-profit organization in the New York City area for users and vendors of products and services for UNIX systems.

Unigroup of New York
G.P.O. Box 1931
New York, NY 10116

The UNIX Users of Minnesota meets on the first Wednesday of each month. For information on times and locations contact:

UNIX Users of Minnesota
Carolyn Downey (612) 934-1199

In the Atlanta area there is a group for people with interest in UNIX or UNIX-like systems:

Atlanta UNIX Users Group
P.O. Box 12241
Atlanta, GA 30355-2241
Marc Merlin (404) 255-2848
Mark Landry (404) 874 6037

In the Seattle area there is a group with over 150 members, a monthly newsletter and meetings the fourth Tuesday of each month.

Seattle / UNIX Group
P.O. 58852
Seattle, WA 98188
Irene Pasternack (206) FOR-UNIX
uw-beaver!tikal!ssc!slug

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USENIX Conference Proceedings Available

Proceedings for the following USENIX conferences are available from the organizations listed. California residents please add applicable sales tax. Payments must be in US dollars payable on a US bank.

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Copies of the proceedings of the Salt Lake City Conference are available for \$25 per copy, and of the Toronto Conference for \$30 per copy. Add \$15 per copy for overseas postage. Send your check or purchase order to:

USENIX Association
P.O. Box 7
El Cerrito, CA 94530

Payment must be received before proceedings will be shipped.

Washington DC UniForum Conference — Winter 1984

Copies of the proceedings of the UniForum Conference are available for \$30 per copy, plus \$20 per copy for overseas postage. They may be ordered from:

/usr/group
4655 Old Ironsides Drive, #200
Santa Clara, CA 95054

San Diego UNICOM Conference — Winter 1983

Copies of the proceedings of the San Diego UNICOM Conference are available for \$25 per copy, plus \$15 per copy for overseas postage. Send your check or money order to:

Software Tools Users Group
1259 El Camino Real, #242
Menlo Park, CA 94025

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OLD: _____ NEW: _____

Phone: _____

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